

SUBMEPP



MS NO. 5640-081-188 REV A

SUBMARINE MAINTENANCE STANDARD

MR DESCRIPTION: Restore gravity drain lower header dividing gate valve.

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Class: SSN688

SUBMEPP APPROVAL

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SYSTEM/COMPONENT ENGINEER/TECHNICIAN

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4/20/01

PROGRAM MANAGER

DATE



REVISIONS/CHANGES		
REV	DESCRIPTION	SUBMEPP APPROVAL & DATE
-	Original issue was developed to cover, in part, maintenance previously covered by TRS No. 4820-086-038 for SSN688 Class.	B. W. Young Eric E. Blough 11/21/97
A	<p>The MS was revised to:</p> <ol style="list-style-type: none"> 1. Incorporate SUBMEPP comments (enhanced MS to support SHAPEC initiatives). 	T. C. Chan Scott E. Mercer 4/20/01
MS NO. 5640-081-188 REV A		PAGE i

MAINTENANCE STANDARD

EQUIPMENT/COMPONENT	MS NO. 5640-081-188
Gravity Drain Lower Header Dividing Gate Valve	
SYSTEM	RELATED MAINTENANCE
Trim and Drain	None

MR DESCRIPTION

1. Restore gravity drain lower header dividing gate valve.

ATTACHMENTS

1. Globe/Gate/Swing Check Valve Material Condition Feedback (MCF) Requirements
2. Equipment Guide List/Maintenance Requirement Parts List
3. Applicable Steps of General Acceptance Criteria (GAC)

TECHNICAL REFERENCE DATA

- (a) Valves, Bronze Flanged, Gate 250 psi WOG Assembly and List of Material

NAVSHIPS Drawing 803-2177917

NOTE: Additional documentation and detailed part drawings that may be required for corrective maintenance are listed in the Maintenance Requirement Parts List.

SAFETY PRECAUTIONS

1. Observe standard safety precautions.
2. Equip hydrostatic test pump with a certified test gage and relief valve. Set relief valve at 56 psig maximum.
3. Equip hydrostatic test pump with a certified test gage and relief valve. Set relief valve at 14 psig maximum.

BOUNDARIES

1. Boundaries of this MS are the entire valve, as depicted on Figure 1, up to and including the inlet and outlet connections.

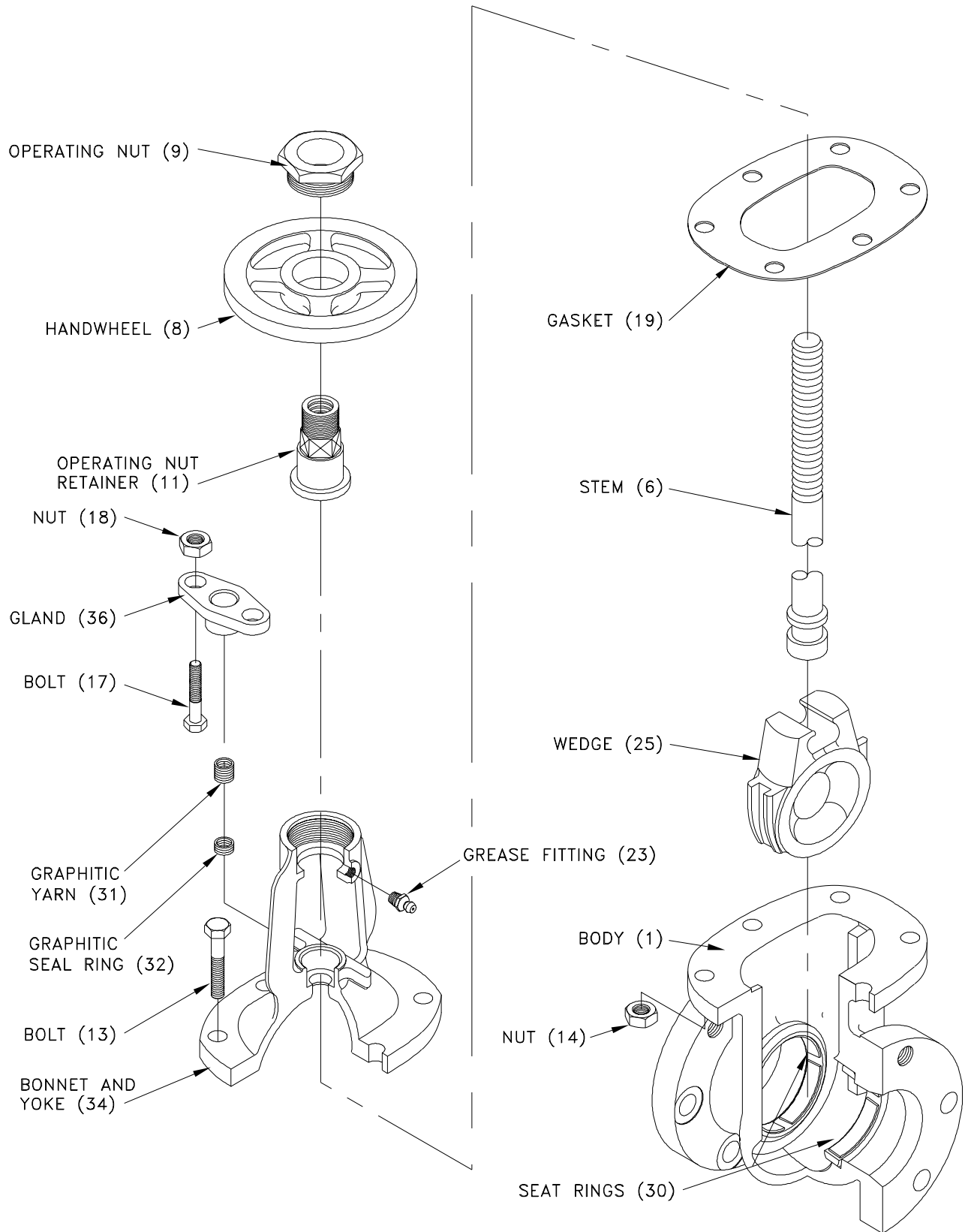


Figure 1. Gravity Drain Lower Header Dividing Gate Valve

PROCEDURE

Preliminary

NOTE 1: In instances where design criteria (e.g., surface finishes, tolerances, etc.) conflict with the criteria of this MS, the criteria of this MS must govern.

- a. Ensure gravity drain lower header dividing gate valve has been isolated, depressurized, and tagged out in accordance with Type Commander's instructions.

1. Restore gravity drain lower header dividing gate valve.

NOTE 2: All parts identified as M (mandatory) in the Maintenance Requirement Parts List must be replaced. Other parts that do not meet the acceptance criteria, as defined herein, may be either repaired to original design requirements, in accordance with approved procedures, or replaced, whichever is more economical. A clarification of the above requirement is that metal removal is allowed to bring unacceptable surface defects within the acceptable limits of this MS, provided the metal removal does not cause any dimensional or geometric requirements of this MS (or the original design, where the MS is silent) to be violated.

NOTE 3: Prior to disassembly, refer to Instructions for Globe/Gate/Swing Check Valve Material Condition Feedback (MCF) Requirements in Attachment 1.

- 1.a. Bleed off any residual pressure remaining in valve body and remove valve from system.
- 1.b. Tag valve to identify location and ship's name; deliver valve to restoring activity.
- 1.c. Clean shipboard piping connections to the extent that no foreign material is visible; maintain cleanliness in accordance with UIPI 0505-908.

NOTE 4: Unless otherwise specified, surface finish and the size and spacing of surface defects may be estimated visually.

NOTE 5: Unless otherwise specified, rhr surface finish requirements apply only to surfaces surrounding acceptable defects and not to the defect areas themselves. Sharp or raised edges on acceptable defects are not acceptable.

NOTE 6: Piece numbers are from Attachment 2.

- 1.d. Inspect shipboard piping connections:
 - 1.d.(1) Inspect flange:
 - 1.d.(1)(a) Visible cracks are not acceptable.
 - 1.d.(1)(b) Flat gasket sealing surface must meet the requirements of Attachment 3 Step 1.c.(2).
 - 1.d.(1)(c) Flange thickness must meet the requirements of Attachment 3 Step 1.b.(4) for a 15/16" nominal flange thickness.

PROCEDURE (Cont'd)

1.d.(2) Inspect bolt and nut:

1.d.(2)(a) Visible cracks are not acceptable.

1.d.(2)(b) Threads must meet the requirements of Attachment 3 Step 1.e.(2).

1.d.(2)(c) Ineffective wrench flats are not acceptable.

1.e. Cover shipboard piping connections to prevent foreign material from entering system.

1.f. Disassemble valve using Reference (a), Figure 1, and the following instructions as guides:

1.f.(1) Matchmark body, piece 1, and bonnet and yoke, piece 34, to maintain their relation upon reassembly, and remove the bonnet bolts, piece 13, and nuts, piece 14.

1.f.(2) Remove the bonnet assembly, including the bonnet and yoke, piece 34; stem, piece 6; wedge, piece 25; and handwheel, piece 8, from the valve body, piece 1, taking care not to drop or damage the wedge as it emerges from the body. Matchmark wedge, piece 25, and body, piece 1, so that the same wedge face and seat ring will be in contact upon reassembly. Remove the wedge, piece 25, from the stem, piece 6.

1.f.(3) Remove the bonnet gasket, piece 19.

1.f.(4) Loosen and remove the gland bolt nuts, piece 18, and gland bolts, piece 17. Lift the gland, piece 36, to relieve pressure on the packing.

CAUTION: Do not use any tool to hold the stem, piece 6, while turning the handwheel, piece 8, as this may damage the stem.

1.f.(5) Remove the stem, piece 6, from the bonnet and yoke, piece 34. Grasp the stem to keep it from rotating and turn the handwheel, piece 8, in the direction to close the valve until the stem threads become disengaged from the threads of the operating nut, piece 9. Carefully pull the stem down through the stuffing box.

1.f.(6) Remove the gland, piece 36.

1.f.(7) Remove the stem packing, pieces 31 and 32.

1.f.(8) Remove the handwheel locknut and handwheel, piece 8.

1.f.(9) Remove the operating nut retainer, piece 11, and operating nut, piece 9, from the bonnet and yoke, piece 34.

1.g. Clean all parts to the extent that no foreign material is visible; maintain cleanliness in accordance with UIPI 0505-908.

NOTE 7: Line of contact is defined as the area of contact between the sealing faces of the wedge, piece 25, and seat ring, piece 30, obtained from blue check impression method inspection.

PROCEDURE (Cont'd)

1.h. Determine the line of contact between wedge, piece 25, and seat ring, piece 30:

- 1.h.(1) Line width must not be less than 1/16".
- 1.h.(2) Line must extend 360 degrees around sealing faces.
- 1.h.(3) Line must be defect free.

NOTE 8: Line of contact is defined as the area of contact between the sealing faces of the stem, piece 6, and bonnet and yoke, piece 34, obtained from blue check impression method inspection.

1.i. Determine the line of contact between stem, piece 6, and bonnet and yoke, piece 34:

- 1.i.(1) Backseat line width must not be less than 1/64" and must not be more than 1/32".
- 1.i.(2) Backseat line must extend 360 degrees around sealing faces.
- 1.i.(3) Backseat line must be defect free.

1.j. Inspect wedge, piece 25:

- 1.j.(1) Mating machined surfaces must be free of nicks, burrs, and high spots.
- 1.j.(2) Surfaces mating with seat rings, piece 30, finish must be rhr 32 or smoother.
- 1.j.(3) Sealing faces surface defects within 1/8" of line of contact, determined in Step 1.h., must not exceed 1/16" in length or width, 3/64" in depth, and defect spacing must not be less than 1/8"; surface defects outside 1/8" of line of contact must not exceed 3/32" in length or width, 1/16" in depth, and defect spacing must not be less than 5/32".

NOTE 9: If metal is removed from sealing faces, an equal amount must be removed from both sealing faces on wedge, piece 25, or seat ring, piece 30, as applicable.

- 1.j.(4) Metal removal from backseat surfaces must not exceed 0.032" or allow the wedge to bottom out in valve. Seating angle must meet the requirements of Reference (a).
- 1.j.(5) Surface defects on remaining surfaces must not exceed 0.050" in depth or cover more than 20 percent of the total surface area.

1.k. Inspect gland, piece 36:

- 1.k.(1) Machined surfaces must be free of nicks, burrs, and high spots.
- 1.k.(2) Surface in way of graphitic yarn, piece 31, and graphitic seal ring, piece 32, surface defects must not exceed 0.015" in width, 0.010" in depth, or cover more than 20 percent of the surface area. Metal removal must not exceed 0.005" below minimum dimensions specified in Reference (a).
- 1.k.(3) Surface finish must be rhr 125 or smoother.

PROCEDURE (Cont'd)

1.1. Inspect body, piece 1:

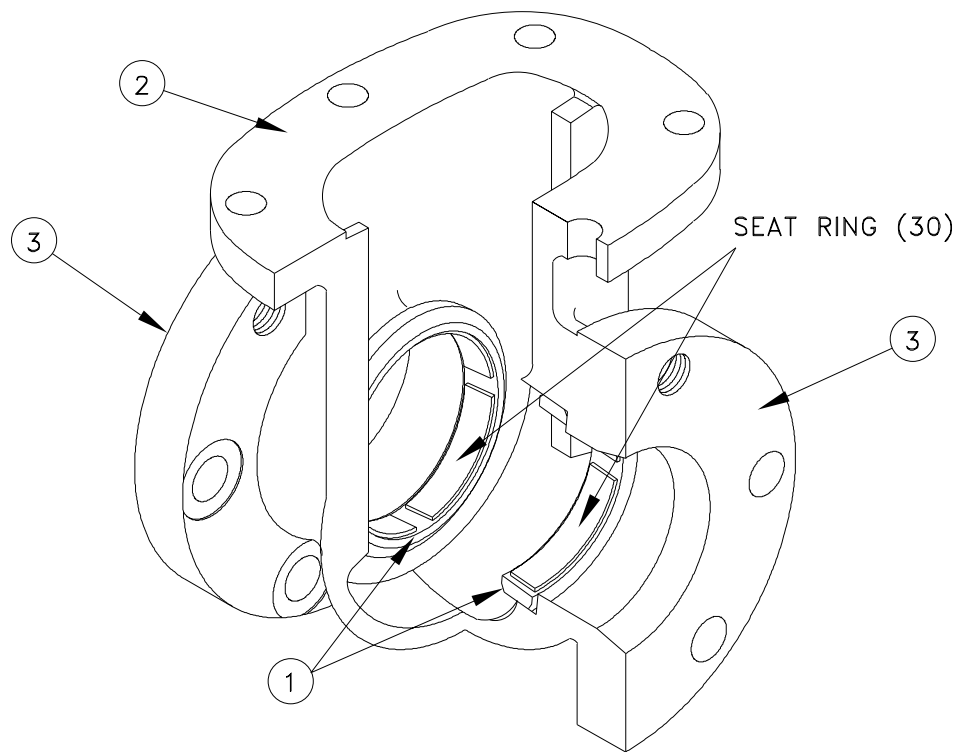


Figure 2. Body

1.1.(1) Visible cracks are not acceptable.

1.1.(2) Mating machined surfaces must be free of nicks, burrs, and high spots.

NOTE 10: Removal of seat ring, piece 30, solely to perform inspections of Step 1.1.(3) is not required.

1.1.(3) Threads must meet the requirements of Attachment 3 Step 1.e.(2).

1.1.(4) Wall thickness must meet the requirements of Attachment 3 Step 1.g.(5).

1.1.(5) Inspect seat ring, piece 30:

1.1.(5)(a) Sealing faces [1] surface defects within 1/8" of line of contact, determined in Step 1.h., must not exceed 1/16" in length or width, 3/64" in depth, and defect spacing must not be less than 1/8"; surface defects outside 1/8" of line of contact must not exceed 3/32" in length or width, 1/16" in depth, and defect spacing must not be less than 5/32".

NOTE 11: If metal is removed from sealing faces, an equal amount must be removed from both sealing faces of wedge, piece 25, or seat ring, as applicable.

1.1.(5)(b) Metal removed from backseat surfaces must not exceed 0.032", or allow the disk to bottom out in valve. Seating angle must meet the requirements of Reference (a).

PROCEDURE (Cont'd)

- 1.1.(5)(c) Surfaces [1] finish must be rhr 32 or smoother.
- 1.1.(5)(d) Surface defects on remaining surfaces must not exceed 0.050" in depth or cover more than 20 percent of the total surface area.
- 1.1.(5)(e) Seat rings must be firmly seated in body; loose seat rings are not acceptable.
- 1.1.(6) Flange flat gasket sealing surface [2] must meet the requirements of Attachment 3 Step 1.c.(1):
 - 1.1.(6)(a) Flange thickness must meet the requirements of Attachment 3 Steps 1.b.(2) and 1.b.(4) for a 5/8" nominal flange thickness.
- 1.1.(7) Flange flat gasket sealing surfaces [3] must meet the requirements of Attachment 3 Step 1.c.(2):
 - 1.1.(7)(a) Flange thickness must meet the requirements of Attachment 3 Steps 1.b.(2) and 1.b.(4) for a 15/16" nominal flange thickness.
- 1.m. Inspect stem, piece 6:

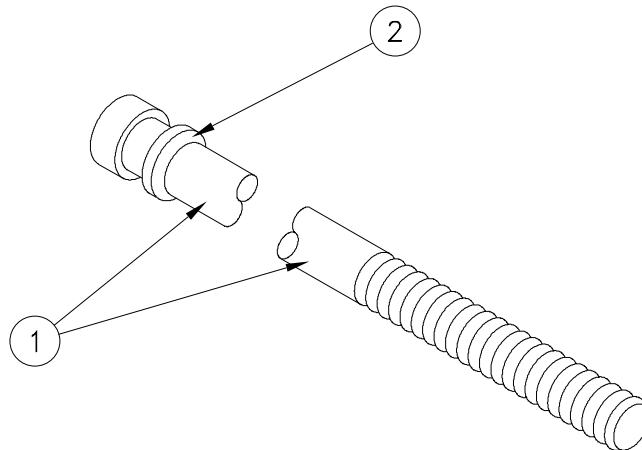


Figure 3. Stem

- 1.m.(1) Visible cracks or bends are not acceptable.
- 1.m.(2) Machined surface [1] and backseat surface [2] finish must be rhr 63 or smoother.
- 1.m.(3) Threads must meet the requirements of Attachment 3 Step 1.e.(2).
- 1.m.(4) Sealing surface [1], in way of graphitic yarn, piece 31, and graphitic seal ring, piece 32, surface defects must not exceed 0.010" in width or 0.005" in depth. Defect spacing must not be less than 1/32". Average defect spacing must not be less than 1/8".
- 1.m.(5) Non-sealing surface [1] surface defects must not exceed 0.015" in width, 0.010" in depth, or cover more than 20 percent of the surface area. Sharp edges on allowable defects are not acceptable.

PROCEDURE (Cont'd)

- 1.m.(6) Sealing face [2], surface defects within 1/8" of line of contact, determined in Step 1.i., must not exceed 1/32" in length, width, or depth, and defect spacing must not be less than 1/16"; surface defects outside 1/8" of line of contact must not exceed 3/32" in length or width, 1/16" in depth, and defect spacing must not be less than 5/32".
- 1.m.(7) Stem must move freely in assembled valve (without packing) without sticking or binding, using hand force only; protruding end must reveal little or no runout.
- 1.m.(8) Diameter [1] must not be less than 0.737".
- 1.n. Inspect operating nut, piece 9, and operating nut retainer, piece 11:
 - 1.n.(1) Mating machined surfaces must be free of nicks, burrs, and high spots; surface finish must be rhr 125 or smoother.
 - 1.n.(2) Threads must meet the requirements of Attachment 3 Step 1.e.(2).
 - 1.n.(3) Ineffective wrench flats are not acceptable.
- 1.o. Inspect bonnet and yoke, piece 34:

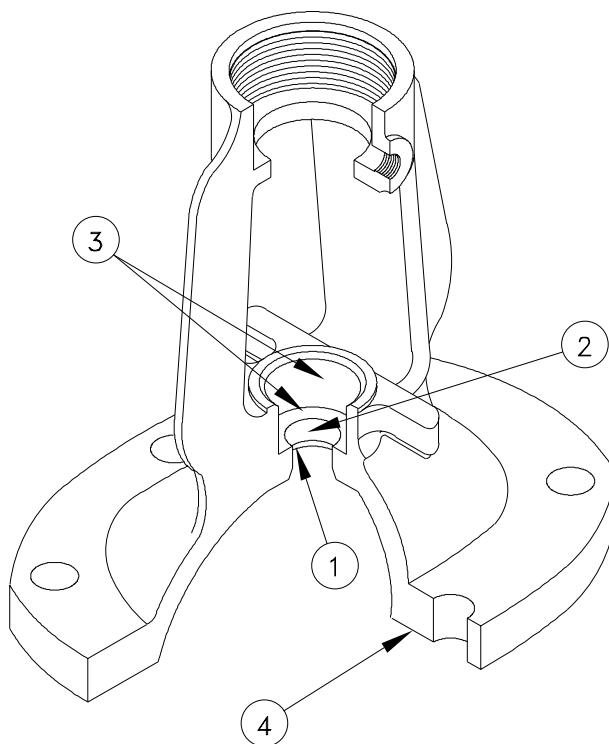


Figure 4. Bonnet and Yoke

- 1.o.(1) Visible cracks or bends are not acceptable.
- 1.o.(2) Machined surfaces [1] and [2] finish must be rhr 32 or smoother.

PROCEDURE (Cont'd)

- 1.o.(3) Bonnet and yoke backseat:
 - 1.o.(3)(a) Seating face [1] surface defects within 1/8" of line of contact, determined in Step 1.i., must not exceed 1/32" in length, width, or depth, and defect spacing must not be less than 1/16"; surface defects outside 1/8" of line of contact must not exceed 3/32" in length or width, 1/16" in depth, and defect spacing must not be less than 5/32".
 - 1.o.(3)(b) Metal removal must not exceed 0.032"; backseat angle must meet the requirements of Reference (a). Sharp edges on allowable defects are not acceptable.
- 1.o.(4) Sealing surfaces [3], in way of graphitic yarn, piece 31, and graphitic seal ring, piece 32, surface defects must not exceed 0.015" in width or 0.010" in depth. Defect spacing must not be less than 3/16". Surface finish must be rhr 125 or smoother.
- 1.o.(5) Packing cavity diameter must not exceed 0.020" beyond requirements of Reference (a).
- 1.o.(6) Wall thickness must meet the requirements of Attachment 3 Step 1.g.(5).
- 1.o.(7) Flange flat gasket sealing surface [4] must meet the requirements of Attachment 3 Step 1.c.(1):
 - 1.o.(7)(a) Flange thickness must meet the requirements of Attachment 3 Steps 1.b.(2) and 1.b.(4) for a 5/8" nominal flange thickness.
- 1.o.(8) Grease passage must be clean and unobstructed.
- 1.o.(9) Threads must meet the requirements of Attachment 3 Step 1.e.(2).
- 1.p. Inspect handwheel, piece 8:
 - 1.p.(1) Visible cracks are not acceptable.
 - 1.p.(2) Ineffective wrench flats are not acceptable.
- 1.q. Inspect grease fitting, piece 23:
 - 1.q.(1) Visible cracks are not acceptable.
 - 1.q.(2) Grease passage must be clean and unobstructed.
 - 1.q.(3) Spring loaded ball must seat firmly and not leak.
 - 1.q.(4) Threads must meet the requirements of Attachment 3 Step 1.e.(2).
 - 1.q.(5) Ineffective wrench flats are not acceptable.
- 1.r. Inspect gland bolt, piece 17, and gland bolt nut, piece 18:
 - 1.r.(1) Visible cracks are not acceptable.

PROCEDURE (Cont'd)

1.r.(2) Threads must meet the requirements of Attachment 3 Step 1.e.(2).

1.r.(3) Ineffective wrench flats are not acceptable.

1.s. Inspect bonnet bolt, piece 13, and bonnet bolt nut, piece 14:

1.s.(1) Visible cracks are not acceptable.

1.s.(2) Mating machined surfaces must be free of nicks, burrs, and high spots.

1.s.(3) Threads must meet the requirements of Attachment 3 Step 1.e.(1).

1.s.(4) Ineffective wrench flats are not acceptable.

1.t. Reassembly:

CAUTION: Grease containing molybdenum disulfide (such as MIL-G-23549 - Molykote), when exposed to seawater, has been known to leave deposits which accumulate, harden, and lead to equipment failure or malfunction. Any areas known to have contained molybdenum disulfide lubricant must be purged or flushed and bearing surfaces cleaned.

1.t.(1) Use M (mandatory) replacement parts identified in the Maintenance Requirement Parts List.

NOTE 12: During reassembly, liberally coat the following surfaces with grease per CID A-A-50433 (Termalene No. 2): ball cavity, stem cavity (excluding threads), ball outer surface, ball seats, O-rings and O-ring mating sealing surfaces, and all stem surfaces (excluding any threads). Lubricate valve threads and threaded fasteners with lubricant per CID A-A-59004 (Molykote P-37 paste).

NOTE 13: If thread sealant and locking compound is required, it must be in accordance with MIL-S-45180, Type II, and MIL-S-22473, respectively. The locking effectiveness of the compound must be checked using the "Stud Installation Verification" paragraph of SAE J2270.

1.t.(2) Verify, using blue check method, 100 percent line of contact between wedge, piece 25, and seat rings, piece 30, seating surfaces.

1.t.(3) Reassemble valve using Reference (a), Figure 1, and the following instructions as guides:

1.t.(3)(a) If seat rings were removed, use sealing compound per MIL-S-45180, Type II, and carefully screw, by hand, seat rings, piece 30, into the body, piece 1. Torque seat rings to 142 (135 to 150) ft-lbs.

1.t.(3)(b) Install the operating nut, piece 9, and operating nut retainer, piece 11, in the bonnet, piece 34, and tighten the operating nut retainer to 57 (50 to 65) ft-lbs.

1.t.(3)(c) Install the handwheel, piece 8, and handwheel locknut on the operating nut, piece 9, and tighten. When replacing handwheel locknut or operating nut, piece 9, replacement of body may be necessary due to possible incompatible threads or existing parts.

PROCEDURE (Cont'd)

- 1.t.(3)(d) Temporarily install the gland, piece 36, gland bolts, and gland bolt nuts. Do not tighten the nuts.
- 1.t.(3)(e) Insert the stem through the bottom of the bonnet, piece 34, and the gland, piece 36, and push it upward until the stem threads just engage the operating nut threads. Holding the stem to keep it from rotating, turn the handwheel, piece 8, in the direction to open the valve until the stem threads are fully engaged with the operating nut threads and continue turning the handwheel until the stem is in the half-open position.
- 1.t.(3)(f) Install the new bonnet gasket, piece 19, on the body, piece 1, flange.
- 1.t.(3)(g) Install the wedge, piece 25, on the stem, piece 6, using the matchmark applied during disassembly, to assure that the same wedge face and seat ring, piece 30, will be in contact upon reassembly.
- 1.t.(3)(h) Carefully lower the bonnet assembly onto the valve body, piece 1, using the matchmarks applied during disassembly, and make certain the wedge, piece 25, properly engages the wedge guides integral with the body, piece 1. The wedge guides have different dimensions from one side of the body to the other to preclude improper assembly of the wedge, piece 25, in the body, piece 1. Install bonnet bolts, piece 13, and nuts, piece 14, loosely to secure the body-bonnet joint.

CAUTION: Careful, uniform tightening of the bonnet bolts, piece 13, and nuts, piece 14, is most important. Avoid stripping threads by not pulling up too hard on any one bolt.

- 1.t.(3)(i) Tighten the bonnet bolts, piece 13, and nuts, piece 14. First tighten all bolts finger tight by taking up alternately on diametrically opposite bolts. Then tighten all bolts in the same sequence and evenly in increments to a torque of 55 (50 to 60) ft-lbs.
- 1.t.(3)(j) Install new packing, pieces 31 and 32; gland, piece 36; gland bolt, piece 17; and gland bolt nut, piece 18. Torque gland bolt nut, piece 18, to 83 in.-lbs consolidations torque.

1.u. Hydrostatic test:

NOTE 14: When major repairs (as defined by CINCLANTFLT/CINCPACFLT INST 4790.3, Volume V) have been accomplished, perform Step 1.u.(1). When minor repairs (as defined by CINCLANTFLT/CINCPACFLT INST 4790.3, Volume V) have been accomplished, omit Step 1.u.(1).

1.u.(1) Strength and porosity test (major repair/H-pressure):

WARNING: Equip hydrostatic test pump with a certified test gage and relief valve. Set relief valve at 56 psig maximum.

- 1.u.(1)(a) With valve in half-open position, pressurize valve to 50 (50 to 51) psig, using fresh water as a test medium; maintain test pressure for at least 30 minutes plus sufficient time to inspect for leakage.

PROCEDURE (Cont'd)

- 1.u.(1)(b) Inspect for external leakage, weeping through pressure-containing parts, and permanent deformation; external leakage, weeping through pressure-containing parts, or permanent deformation is not acceptable. Observation of water or wetting at fluid boundary at the stem packing does not constitute leakage unless droplets form which flow away from point of origin within 5 minutes of formation.

- 1.u.(2) Mechanical joint tightness test (minor repair/J-pressure):

WARNING: Equip hydrostatic test pump with a certified test gage and relief valve. Set relief valve at 14 psig maximum.

- 1.u.(2)(a) With valve in half-open position, pressurize valve to 12 (12 to 13) psig, using fresh water as a test medium; maintain test pressure for at least 3 minutes plus sufficient time to inspect for leakage.

- 1.u.(2)(b) Inspect for external leakage; external leakage is not acceptable.

- 1.u.(3) Seat tightness test:

- 1.u.(3)(a) Cycle valve.

WARNING: Equip hydrostatic test pump with a certified test gage and relief valve. Set relief valve at 14 psig maximum.

- 1.u.(3)(b) With valve shut, pressurize valve from tank side to 12 (12 to 13) psig, using fresh water as a test medium; maintain test pressure for at least 3 minutes plus sufficient time to inspect for leakage. Test to be conducted on both sides.

- 1.u.(3)(c) Measure seat leakage; seat leakage must not exceed 25 cc per hour per inch of nominal pipe size (75 cc/hour).

- 1.u.(3)(d) Cycle valve.

- 1.v. Operational test:

- 1.v.(1) Cycle valve; valve must operate without sticking or binding.

- 1.v.(2) Valve indication must agree with valve position.

- 1.w. Deliver gate valve to ship.

- 1.x. Reinstall gate valve in system using M (mandatory) replacement parts identified in the Maintenance Requirement Parts List.

- 1.x.(1) Tighten bolt and nut evenly in a normal tightening sequence to allow gasket compression of 20 to 30 percent. To the maximum extent possible, maintain flanges parallel during the tightening sequence.

PROCEDURE (Cont'd)

- 1.y. Ensure tags are cleared in accordance with Type Commander's instructions.
- 1.z. Post-installation tightness test:
 - 1.z.(1) Pressurize valve inlet by conducting a system operational test. Maintain test pressure for at least 30 minutes.
 - 1.z.(2) Inspect for external leakage at inlet side mechanical joint; external leakage at inlet side mechanical joint is not acceptable.

Globe/Gate/Swing Check Valve Material Condition Feedback (MCF) Requirements

Instructions

- (1) Observe the general condition of all parts during disassembly for extreme area of wear or deterioration, breakage, or unusual conditions which might affect performance.
- (2) Observations are to be performed prior to scrapping parts (if they are to be replaced) and prior to performing any work or mechanical cleaning which would modify the "as-disassembled" condition.
- (3) Record specific piece/part condition(s) and related failure mechanisms (e.g., bent, cracked, scored, corroded, or eroded, etc.).
- (4) Record in the "Other" section of the Material Condition Feedback Form any unsatisfactory findings that were not specifically inspected for in the Maintenance Standard.
- (5) The Material Condition section of Attachment 1 must be completed, however, to reduce paperwork, you are encouraged to attach copies of work center or shop produced forms and records in lieu of completing the applicable sections of Attachment 1 (e.g., TGI, Mechanical Component Record, Shop Test Record, etc.), provided they meet the requirements of "as-found condition" and/or "corrective action" information.

MATERIAL CONDITION FEEDBACK (MCF) REQUIREMENTS FOR GLOBE/GATE/SWING CHECK VALVES	SEND INFORMATION TO SHIPYARD SMPC (VIA WORK PACKAGING)	OR MAIL TO 	COMMANDING OFFICER SUBMEPP CODE 1810 P.O. BOX 7002 PORTSMOUTH NH 03802-7002		
HULL: _____ AVAIL (SRA, Refit #): _____ COMPONENT: _____ Ser.# (TRIPER/AERP): _____		SWLIN/SSI: _____ SWLIN PARA#/MRN: _____ Job Order (JCN, TGI): _____ FGC/HSC: _____			
COMPONENT CONDITION ASSESSMENT					
Was component in operating condition prior to restoration? ___ Yes ___ No ___ Unknown		If No, please provide reason.			
Inspection Criteria: =====>>	1. Meets MS criteria with no or light handworking required. 2. Machining required to meet MS criteria. 3. Material build-up required (e.g., weld, epoxy coat, electroplating) to meet MS criteria. 4. Part replacement required.				
Inspection Area:	1	2	3	4	Failure Mode Evidence and Comments:
<u>Seat sealing area:</u> body/sealring					
<u>Stem bearing area:</u> body bonnet stem					Is there any evidence of binding (e.g., galling)? ___ Yes (explain) ___ No
<u>Stem sealing area:</u> body bonnet stem					Is there any evidence of leakage past the seal? ___ Yes (explain) ___ No
<u>Disk/Gate:</u> seat sealing area					
<u>Body cavity:</u> wall thickness (when req'd by MS)					
Other: (Supplemental comments on condition or work done to this component, e.g., entire component or unit replaced, changes to mandatory/contingency parts) 					
(Attach additional sheet/information if needed)					_____ Mechanic/Point of Contact
					_____ Date

Equipment Guide List and Maintenance Requirement Parts List

EQUIPMENT GUIDE LIST					
IDENTIFICATION NO.					APL
GD-001					882047763
GD-001					882042017
MAINTENANCE REQUIREMENT PARTS LIST					
DRAWING NO. NAVSHIPS dwg 803-2177917 Rev F					
DESCRIPTION	PIECE NO.	QTY	CAGE	PART NO.	*M/C/S
Gasket	19	1	80064	2177917-03X-19	M
Graphitic yarn	31	2	80064	2177917-03X-31	M
Graphitic seal ring	32	2 (min)	80064	2177917-03X-32	M
Body	1	1	80064	2177917-03X-01	C
Stem	6	1	53711	2177917-03X-06	C
Handwheel	8	1	80064	2177917-03X-08	C
Operating nut	9	1	80064	2177917-03X-09	C
Operating nut retainer	11	1	80064	2177917-03X-11	C
Bonnet bolt	13	6	80064	2177917-03X-13	C
Bonnet bolt nut	14	6	80064	2177917-03X-14	C
Gland bolt	17	2	80064	2177917-03X-17	C
Gland bolt nut	18	2	80064	2177917-03X-18	C
Grease fitting	23	1	80064	2177917-03X-23	C
Wedge	25	1	80064	2177917-03X-25	C
* Mandatory/Contingency/Special Tool					

MAINTENANCE REQUIREMENT PARTS LIST (Cont'd)					
DRAWING NO. NAVSHIPS dwg 803-2177917 Rev F (Cont'd)					
DESCRIPTION	PIECE NO.	QTY	CAGE	PART NO.	*M/C/S
Seat ring	30	2	80064	2177917-03X-30	C
Bonnet and yoke	34	1	80064	2177917-03X-34	C
Gland	36	1	80064	2177917-03X-36	C
DRAWING NO. NAVSHIPS dwg 508-4458428 Rev U					
Gasket	None	2	43689	MIL-A-17472	M
Bolt	None	8	43689	QQN281CLA	C
Flange	None	2	43689	MIL-F-20042	C
Nut	None	8	43689	QQN281CLB	C
* Mandatory/Contingency/Special Tool					

Applicable Steps of General Acceptance Criteria (GAC)

NOTE: This attachment contains only those steps from MS No. 7650-081-001G, General Acceptance Criteria, that are necessary to accomplish the inspections required by this MS.

1. General acceptance criteria

1.b. Flange thickness:

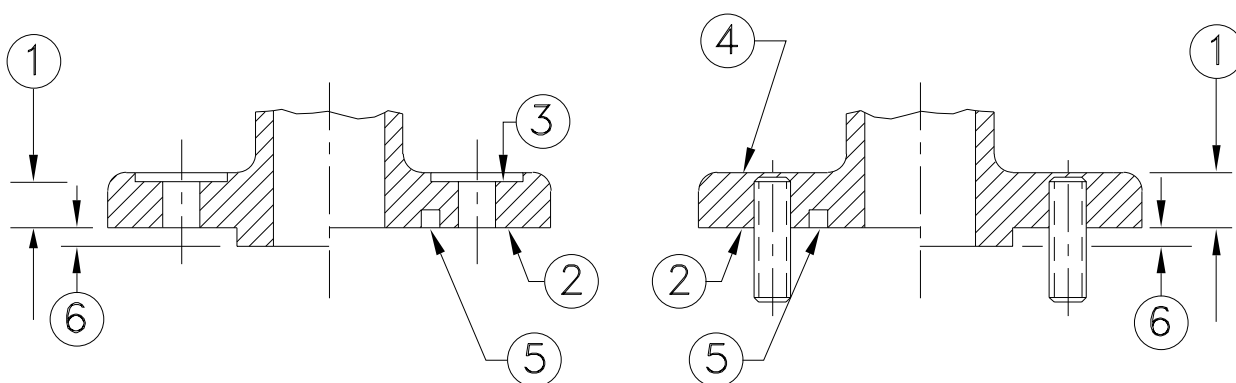


Figure 5. Flange Thickness

- NOTE 11: Flange thickness [1] is defined as the thickness from the finished machined face [2] to the back machined spotface [3], Figure 5 - left, or the thickness from the finished machined face [2] to the as-cast/as-forged back face [4], Figure 5 - right.
- NOTE 12: For non-hull flanges, thickness measurements are not required on flanges where visual inspection verifies no erosion or corrosion.
- NOTE 13: If drawing minimum flange thickness is less than the minimum specified in this section, drawing minimum applies.
- NOTE 14: For non-hull flanges, the minimum average thickness, Table 5 - column C, is determined by averaging 5 spotface thickness measurements, some of which may be below the minimum thickness, Table 5 - column B. If front face [2] to spotface [3] dimension [1], Figure 5 - left, meets or exceeds the minimum thickness, Table 5 - column B, it will be obvious that the minimum average dimensions are acceptable without an arithmetic determination of the average.
- NOTE 15: For flanges with raised faces, refer to Step 1.b.(5).
- NOTE 16: Since reduction of flange thickness may affect fit-up/alignment requirements, an engineering judgement must be obtained before performing Step 1.b.(1)(b) or Step 1.b.(2)(a) unless the equipment or component MS specifically allows the reduction.

1.b.(2) Flat gasket flanges:

- 1.b.(2)(a) Material may be removed from the front face [2] to meet sealing surface requirements of Step 1.c. providing flange thickness [1] is not reduced to less than the value or values specified in Table 5. On flanges where gasket compression is determined by a space remaining after metal-to-metal contact, the gasket space must meet drawing requirements.

NOTE 17: Table 5, columns A, B, and C, identifies hull flange minimum and non-hull flange minimum and average minimum acceptable thicknesses, respectively, for common sizes of flanges. For nominal flange thicknesses not listed in Table 5, the following acceptance criteria apply.

Table 5. Minimum Acceptable Flange Thickness								
Nominal Flange Thickness (Note 11 and Note 15)	Hull Flanges	Non-Hull Flanges			Nominal Flange Thickness (Note 11 and Note 15)	Hull Flanges	Non-Hull Flanges	
	A Minimum (Note 13)	B Minimum (Note 13)	C Min Avg* (Note 14)			A Minimum (Note 13)	B Minimum (Note 13)	C Min Avg* (Note 14)
1/8	0.113	0.113	0.119		1-5/8	1.593	1.503	1.564
1/4	0.235	0.225	0.238		1-11/16	1.656	1.561	1.624
5/16	0.298	0.281	0.297		1-3/4	1.718	1.619	1.684
3/8	0.360	0.338	0.356		1-13/16	1.781	1.677	1.745
7/16	0.423	0.394	0.416		1-7/8	1.844	1.734	1.804
1/2	0.485	0.450	0.475		1-15/16	1.906	1.792	1.865
9/16	0.548	0.506	0.534		2	1.969	1.850	1.925
5/8	0.610	0.563	0.594		2-1/8	2.062	1.975	2.050
11/16	0.673	0.619	0.653		2-3/16	2.125	2.038	2.113
3/4	0.735	0.675	0.713		2-1/4	2.187	2.100	2.175
13/16	0.798	0.731	0.772		2-3/8	2.312	2.225	2.300
7/8	0.860	0.788	0.831		2-1/2	2.437	2.350	2.425
15/16	0.923	0.844	0.891		2-5/8	2.562	2.475	2.550
1	0.985	0.900	0.950		2-3/4	2.687	2.600	2.675
1-1/16	1.031	0.963	1.013		2-7/8	2.812	2.725	2.800
1-1/8	1.093	1.025	1.075		3	2.937	2.850	2.925
1-3/16	1.156	1.088	1.138		3-1/8	3.062	2.969	3.047
1-1/4	1.218	1.150	1.200		3-1/4	3.187	3.088	3.169
1-5/16	1.281	1.213	1.263		3-3/8	3.312	3.206	3.291
1-3/8	1.343	1.272	1.323		3-1/2	3.437	3.325	3.413
1-7/16	1.406	1.330	1.384		3-5/8	3.562	3.444	3.534
1-1/2	1.468	1.388	1.444		3-3/4	3.687	3.563	3.656
1-9/16	1.531	1.445	1.504		4	3.937	3.800	3.900
All dimensions are in inches.								
* A minimum of 5 measurements is necessary to arithmetically determine average thickness.								

- 1.b.(4) Acceptance criteria for flanges other than hull flanges. Minimum and minimum average thicknesses (before and after restoration) must be determined as follows:
- 1.b.(4)(a) Flanges through 1" thick:
- 1.b.(4)(a)1 Minimum thickness must not be less than 90 percent of drawing nominal flange thickness.
- 1.b.(4)(a)2 Average minimum thickness must not be less than 95 percent of drawing nominal flange thickness.
- 1.b.(4)(b) Flanges over 1" through 1-1/3" thick:
- 1.b.(4)(b)1 Minimum thickness must not be less than drawing nominal flange thickness -0.100".
- 1.b.(4)(b)2 Average minimum thickness must not be less than drawing nominal flange thickness -0.050".
- 1.b.(4)(c) Flanges over 1-1/3" through 2" thick:
- 1.b.(4)(c)1 Minimum thickness must not be less than 92.5 percent of drawing nominal flange thickness.
- 1.b.(4)(c)2 Average minimum thickness must not be less than 96.25 percent of drawing nominal flange thickness.
- 1.b.(4)(d) Flanges over 2" through 3" thick:
- 1.b.(4)(d)1 Minimum thickness must not be less than drawing nominal flange thickness -0.150".
- 1.b.(4)(d)2 Average minimum thickness must not be less than drawing nominal flange thickness -0.075".
- 1.b.(4)(e) Flanges over 3" thick:
- 1.b.(4)(e)1 Minimum thickness must not be less than 95 percent of drawing nominal flange thickness.
- 1.b.(4)(e)2 Average minimum thickness must not be less than 97.5 percent of drawing nominal flange thickness.

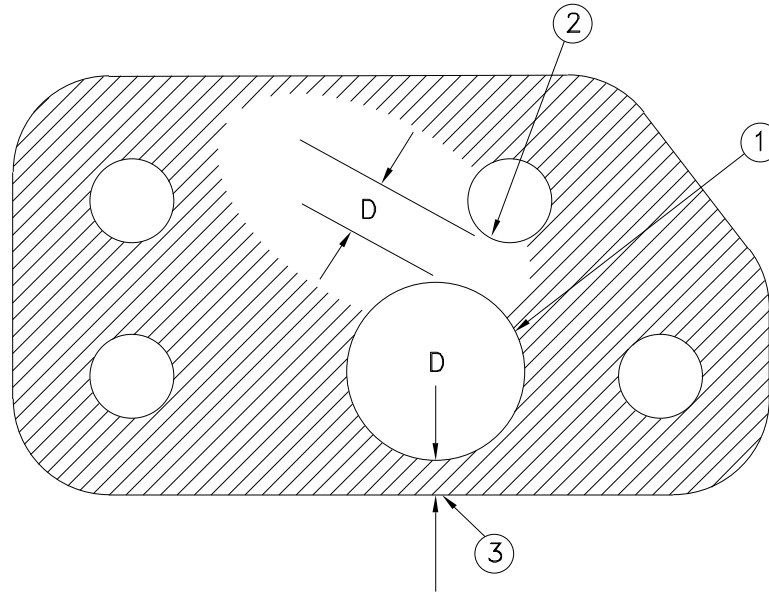
1.c. Flat gasket sealing surfaces:

Figure 6. Flat Gasket Sealing Surfaces

- NOTE 18: D is the distance from inner edge of gasket [1] to inner edge of closest gasket bolt hole [2], or the distance from inner edge of gasket [1] to closest outside edge of gasket [3], whichever is less. For gaskets without bolt holes, D is the distance from inner edge of gasket [1] to closest outside edge of gasket [3].
- NOTE 19: Unless otherwise specified, surface finish and the size and spacing of surface defects may be estimated visually.
- NOTE 20: Unless otherwise specified, rhr surface finish requirements apply only to surfaces surrounding acceptable defects and not to the defect areas themselves. Sharp or raised edges on acceptable defects are not acceptable.
- NOTE 21: Lay is defined as the direction of the predominant surface pattern caused by the machining operation.

1.c.(1) Sealing surfaces machined with straight lay (see Note 18 through Note 21):

- 1.c.(1)(a) Any surface defect or series of surface defects which, if connected, would form a leakage path to any gasket bolt hole [2] or any outer gasket edge [3] is acceptable provided normal gasket contact greater than one half of D exists along that path.
- 1.c.(1)(b) Raised or sharp edges of acceptable surface defects on gasket contact surface are not acceptable.

- 1.c.(1)(c) Gasket contact surface mating with metallic, metal-jacketed, spiral-wound, metal-graphite, and spiral-wound metal-asbestos gaskets, except for surface defects accepted by Step 1.c.(1)(a), must have a finish of rhr 125 or smoother.
- 1.c.(1)(d) Gasket contact surface mating with flat gaskets, except for surface defects accepted by Step 1.c.(1)(a), must have a finish of rhr 500 or smoother.
- 1.c.(2) Sealing surfaces machined with concentric or phonographic lay (see Note 18 through Note 21):
 - 1.c.(2)(a) Any surface defect or series of surface defects which, if connected, would form a leakage path to any gasket bolt hole [2] or any outer gasket edge [3] is acceptable provided normal gasket contact greater than one half of D exists along that path.
 - 1.c.(2)(b) Raised or sharp edges of acceptable surface defects on gasket contact surface are not acceptable.
 - 1.c.(2)(c) Gasket contact surface mating with metallic, metal-jacketed, spiral-wound, metal-graphite, and spiral-wound, metal-asbestos gaskets, except for surface defects accepted by Step 1.c.(2)(a), must have a finish of rhr 500 or smoother.
 - 1.c.(2)(d) Gasket contact surface mating with flat gaskets, except for surface defects accepted by Step 1.c.(2)(a), must have a finish of rhr 500 to 1000 for concentric cuts and rhr 125 to 250 for phonographic cuts.

TECHNICAL REFERENCE DATA

(a) Submarine Fastening Criteria

NAVSEA S9505-AM-GYD-010

1.e. Threads and self-locking fasteners:

- NOTE 23: Removal of threaded fasteners or thread inserts only to determine acceptability of threads is not required.
- NOTE 24: Reinstallation of studs with anaerobic sealant must be in accordance with recommended vendor procedures or approved local overhaul facility procedures.
- NOTE 25: If necessary, threads should be cleaned before applying these acceptance criteria.
- NOTE 26: Thread requirements apply to the load bearing portions of the fastener only. Defects are acceptable on the free end of the fastener only if they cannot cause damage to the engaging threads.

- NOTE 27: Steam turbine fasteners with original copper plating disturbed need not be replated or replaced, provided anti-galling (compound) lubricant per CID A-A-59004 (Molykote P-37 paste) is used. If replacement fasteners are necessary, they need not be copper plated, provided anti-galling (compound) lubricant per CID A-A-59004 (Molykote P-37 paste) is used.
- NOTE 28: Reference (a) should be used for repair, installation, and replacement of threads and fasteners.

1.e.(1) Type I threads and self-locking fasteners:

- 1.e.(1)(a) Cracks are not acceptable.
- 1.e.(1)(b) Broken, chipped, or missing threads are not acceptable.
- 1.e.(1)(c) Isolated minor defects are allowed. An isolated minor defect is a single nick, gouge, or flattened thread (after removal of sharp edges and raised metal), that has a depth greater than 1/64" but less than 1/2 the thread height (depth) and a width less than the thread spacing (pitch). Defects less than 1/64" may be ignored.
- 1.e.(1)(d) An isolated minor defect that exceeds the width criteria is acceptable when the total length of the defect does not exceed 15 percent of 1 thread length in any 1 complete thread. One complete thread or 1 thread length is defined as 1 complete rotation (360° on a single thread), starting at a point along the thread.
- 1.e.(1)(e) Any combination of minor defects is acceptable when the total combined length of the defects does not exceed 15 percent of 1 thread length on 1 complete thread.
- 1.e.(1)(f) Clearance fit threads must engage by hand.
- 1.e.(1)(g) The locking insert on externally threaded male fasteners must be replaced at each reuse; however, the locking portion may be reused if the element generates a breakaway torque of at least 25 percent of the value listed for the appropriate size in Reference (a) Table 3-4. If logistic problems prohibit compliance with these requirements, threaded male fasteners may be reused by applying an anaerobic thread locking compound chosen to allow future removal (such as MIL-S-22473 Grade C or CVV). Self-locking nuts must meet the requirements of Reference (a) Paragraph 3-41.e(1).

1.e.(2) Type II threads and self-locking fasteners:

- 1.e.(2)(a) Thread defects that do not go beyond the thread root diameter are acceptable provided total surface of all engaged threads is not reduced more than 10 percent as estimated visually.

- 1.e.(2)(b) Clearance fit threads must engage by hand.
- 1.e.(2)(c) The locking insert on externally threaded male fasteners must be replaced at each reuse; however, the locking portion may be reused if the element generates a breakaway torque of at least 25 percent of the value listed for the appropriate size in Reference (a) Table 3-4. If logistic problems prohibit compliance with these requirements, threaded male fasteners may be reused by applying an anaerobic thread locking compound chosen to allow future removal (such as MIL-S-22473 Grade C or CVV). Self-locking nuts must meet the requirements of Reference (a) Paragraph 3-41.e(1).

1.g. Wall thickness:

NOTE 33: Wall thickness acceptance criteria applies to all wetted pressure boundary surfaces. Thickness measurements are not required in those areas where visual inspection verifies that no erosion or corrosion has occurred.

1.g.(5) Wall thickness criteria (condensate or other low-pressure non-seawater components):

- 1.g.(5)(a) Wall thickness reduction is acceptable to a maximum of 1/16" (or 20 percent of the original minimum wall, whichever is less) below the minimum drawing thickness (considering original manufacturing tolerances if known). The surface defects can cover 100 percent of the exposed surface.
- 1.g.(5)(b) Additional surface defects or small pockets (diameter not to exceed twice the nominal wall thickness) over the whole exposed area which will result in additional local wall reduction are acceptable if the following stipulations are complied with:
 - 1.g.(5)(b)1 Defect area is not more than 20 percent of the exposed area.
 - 1.g.(5)(b)2 Depth of the defects is not more than 20 percent of the minimum drawing thickness to a maximum of 1/8" with a minimum average distance between defects of 1/8".